

Medical and social aspects of qat in Yemen: a review

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Introduction

Qat is a plant whose leaves are chewed for their stimulating effect. It is produced in large quantities in Yemen Arab Republic and Ethiopia, and to a lesser extent in the Democratic Republic of Yemen, Djibouti and Kenya. Production in the Yemen Arab Republic has increased greatly since 1947, with significant consequences for the pattern of development. It plays a major part in the social customs of the region.

History

A 10th century Yemeni writer, Hamdani, who comprehensively discussed many aspects of his native country, makes no mention of qat¹. It was probably introduced into Yemen from Ethiopia, from whence the earliest accounts of its use are found. The first account of its introduction to Yemen is in an account from about AD 1345², although Ibn Battouta, a writer who travelled extensively through South Arabia in the 14th century, did not mention it despite extensive references to plants in his other works³. According to another legend, Shaikh Ibrahim Abu Zaharbi, an Islamic saint from Berbera, in present day Somalia, travelled to Harar in Ethiopia around 1430, the then centre of qat cultivation, and thence introduced it to Yemen (Figure 1).

By the 16th century it seems to have become established in the highlands of Yemen, and the Danish explorer Niebuhr stated that during his journey in 1762 the locals were chewing qat continually. It was given its scientific name by Forskal during his journey through Yemen in 1765³. By the early 19th century it was well established in Aden and the area around Taiz⁴. On the coastal plain, in contrast, Thesiger⁵ found that it was only sold and chewed in two small areas in 1947.

Production

Qat (*Catha edulis*) is a member of the family Celastraceae. It grows to a height of 6 metres at altitudes between 1500 and 2500 m. It is predominantly produced in the mountains of the Yemen Arab Republic and the Harar plateau of Ethiopia. It also occurs sporadically in Turkestan, Afghanistan, Kenya, Uganda, Tanzania, Zaire and Zimbabwe⁶. It requires a high rainfall and grows best on acid, well-drained clay soils. With careful attention there may be up to four harvests in a year. In some areas irrigation enables a high level of control over production, and one of these, Wadi Dahr, close to Sana'a, the capital of the Yemen Arab Republic, is renowned for the high quality of its produce.

The system of production and marketing has been described in detail by Weir⁷. In qat-growing areas it may occupy up to 30% of the cultivable land, and a

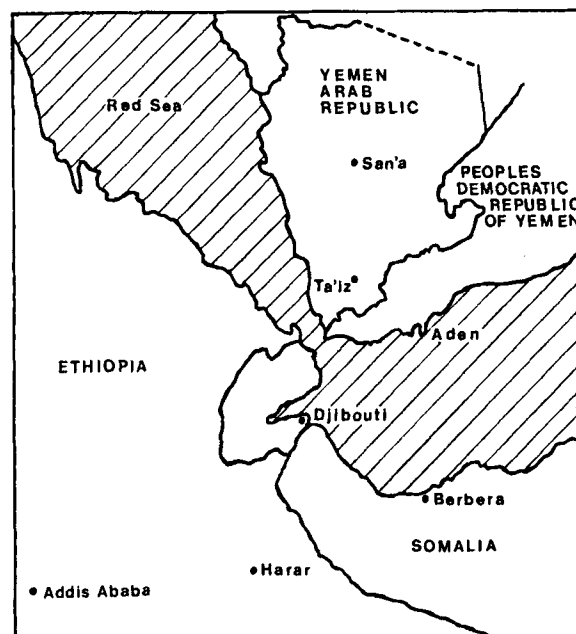


Figure 1. Map of Yemen and surrounding countries

high proportion of the local workforce are involved at some stage in the industry. Most landowners whose terraces receive adequate rain grow at least a few trees and may employ others to cultivate the land. Some owners will sell the qat whilst on the tree to traders who will employ pickers and transporters. As trees become ready at varying times, this provides fairly steady employment. In some areas banana stems are used to keep the qat moist on the way to market. This has resulted in the income from stems exceeding that obtained from the fruit.

Qat production has remained in the hands of smallholders due to a combination of circumstances. It is highly perishable and will lose its price if it is more than a few days old. Traders buy it on the tree on the basis of the most recent prices and then have only a few days to sell it (Figure 2). They therefore run the risk of the price being depressed due to others attempting to reap the benefit of recent high prices by rushing several truckloads to market. The optimum strategy with a perishable product in an unpredictable market is to bring small quantities to market at a time.

Legal position

The Advisory Committee of the League of Nations on the Traffic in Opium and other Dangerous Drugs examined the problem of qat in 1935⁸. On the basis of the evidence presented it was considered that no international action was required, but the cultivation, sale and use of qat have been prohibited at



Figure 2. A qat seller in the highlands of Yemen

times—as in British Somaliland in 1921 and 1939, Kenya in 1934 and Aden in 1957. The position was reconsidered by the UN Commission on Narcotic Drugs in 1956 and it postponed a decision until more information on its effects was available.

Government policies

In the Yemen Arab Republic there has been a concerted campaign to dissuade people from chewing qat⁹. Television schedules are planned to have the most popular programmes in the afternoon in order to provide an alternative to qat parties. The Family Radio Programme, Rukin al'Usra, is a half-hour broadcast twice daily on various aspects of health which has emphasized the deleterious aspects of qat.

In the Peoples Democratic Republic of Yemen, recent policy is that 'qat chewing is beneficial in that it breeds friendliness and good social behaviour'¹⁰. It is, however, felt to be desirable to prevent the younger generation developing the habit.

The government of Aden Colony had reacted to the dramatic rise in imports of qat in the 1950s and the consequent drain of sterling by banning the import of qat⁶. It was not, however, banned in the Protectorate and there was substantial smuggling. The Ethiopian government reacted to the loss of revenue by revoking the licence of Aden Airways to operate to Addis Ababa. The ban was lifted the following year. The government of the Yemen Arab Republic banned qat for a period of one week in 1972, but this was lifted one week later after a war with the Peoples Democratic Republic of Yemen.

Djibouti was confronted with a similar problem, and in 1957 the Public Health Code of France was amended to ban the possession of qat⁶. It was, however, felt prudent not to apply this to Djibouti! Although, unlike alcohol, it is not specifically proscribed in the Qur'an, it is banned on religious grounds in Saudi Arabia¹¹.

Pharmacology and clinical aspects

The pharmacology of qat has been reviewed in detail by Halbach¹² and subsequently by a WHO advisory group¹³, and by Kalix¹⁴. For many years the active ingredient was thought to be nor-pseudoephedrine which had been isolated in 1901 and subsequently

identified in 1930 by Wolfes. Nor-pseudoephedrine has amphetamine-like effects. Subsequent work identified a labile active compound which is present in fresh leaves but absent from samples over 5 days old. This finding corresponds with the observation by qat chewers that the leaves lose their potency after 4 days.

The substance has been identified as (-)- α -amino-propionophenone, which had not previously been found in nature and has been named cathinone. In addition, a number of alkaloids with a similar structure have been isolated. These are now known as cathedulins. Tannins are also present in varying quantities. Vegetable tannins are a large group of phenolic compounds occurring in a wide variety of plants. Their common feature is the ability to convert animal skin to leather, and include compounds ranging from simple phenols to complex macromolecules. They are absorbed from the gastrointestinal tract¹⁵.

It has been suggested that there is an association between areas of high intake of tannin-containing plants and oesophageal carcinoma¹⁶, although a study of the mutagenicity of betel nuts suggested that other compounds such as alkaloids might be of more importance than tannins in producing carcinomas¹⁷. Hepatic damage has been described following absorption of large quantities of tannins through extensively burnt skin¹⁸, and in association with tannin-containing barium enemas¹⁹. Conversely, some tannins have been shown to prevent carbon tetrachloride-induced damage to hepatocytes *in vitro*²⁰. Tannin extracted from tea has been shown to inhibit motility in isolated segments of rat and rabbit intestine²¹.

The acute pharmacological effects of qat in humans are wide-ranging and include tachycardia, hypertension, transient facial and conjunctival congestion, headaches, increased respiration and inhibition of micturition. Psychological effects include, excitement, increased alertness, anxiety and aggressive behaviour. Insomnia is a constant feature. Anorexia is caused by nor-pseudoephedrine. Manic psychosis similar to that associated with amphetamines has been reported in several East African patients living in Europe and North America who continued to chew qat²²⁻²⁴, but psychological disturbances other than insomnia seem to be rare in Yemen¹¹.

Extrapolation of the pharmacological effects of the ingredients of qat and anecdotal evidence have suggested a number of consequences of long-term use^{12,25}, but the generally unpleasant effects of extracts of qat in pharmacological quantities contrast with the widely held view among Yemenis that qat is beneficial to their health. Kennedy *et al.*¹¹ conducted an extensive study of the health status of groups of non-users and light and heavy users of both sexes during 1974–1976 in the three major cities of the Yemen Arab Republic. This suggested that many of the long-term effects previously ascribed to qat were probably a result of the very poor level of general health, and not specifically related to qat consumption. They found a suggestion of an association between the prevalence of severe illness and qat use in men, and this association was strong among women. The difference was thought to be related to the better nutritional status of Yemeni men.

The gastrointestinal system is generally considered to be frequently affected by qat, and the

commonest problems mentioned by users are gastritis and constipation. Qat may act on the gut in two ways. Tannins may have an irritant effect on the mucosa, and the alkaloids may affect motility and secretions. Kennedy *et al.*¹¹ confirmed a dose-related association between qat chewing and gastrointestinal symptoms, especially gastritis. The relationship with constipation is suggested by the observation of a decrease of 90% in consumption of laxatives in Aden when qat was banned in 1957¹².

Periodontal disease and stomatitis have been ascribed to qat chewing, and although Kennedy *et al.*¹¹ did not confirm this association, they did not exclude the possibility that there may be an association with oral cancer. It is also possible that some reports of oral cancer may have been associated with chewing of both qat and shama (finely ground tobacco).

An association between qat use and cirrhosis has been suggested^{12,25} but not confirmed¹¹. A dose-related relationship between qat use and respiratory problems has been found in males, but as this is absent in females it may be due to the association of qat with tobacco smoking¹¹. It has been suggested that qat may have a protective effect on the cardiovascular system^{25,26}, though this was not confirmed by Kennedy *et al.*¹¹, and although nor-pseudoephedrine might be expected to cause cardiovascular problems in the elderly this does not seem to be common.

Social position of qat

Until the early 1970s, in Yemen, qat chewing was restricted to an affluent, mainly urban minority. Among this group chewing takes place in qat parties²⁷. After lunch the men retire to the *mifrij*, or 'room with a view', which is at the top of most Yemeni houses. Coffee is served and the *madā* or pipes are lit, following which the qat is handed round. Each man has one or two branches from which he plucks the tenderest leaves and shoots and then chews. Only the juice is swallowed, and the cheek becomes increasingly full. Eventually it is spat out and the mouth is rinsed with water prior to starting again. These parties often last from 2 until 8 pm, and are repeated day after day.

Qat chewing is not restricted to males, and Makhoul⁹ describes the practice of *tafrika*, or afternoon visit, which commences following afternoon prayers. Although often held to mark 'rites of passage', it has now taken on a prominent role in the ordinary social life of Yemeni women. The women emerge, veiled in black, carrying large bunches of qat. On arrival in the house where the *tafrika* is being held, they take off their veils and shoes to reveal brightly coloured clothes. They smoke the *madā* and pass around nuts and sweets. About one-third then chew qat. After a while there is some music, now often provided by a cassette, and some dancing. The meeting ends in time for evening prayers.

It is likely that qat chewing has been more widespread in the southern part of Yemen in the past. In the 1840s qat chewing was common among Arab labourers in Aden⁴. Taiz has long been a major centre of trade for produce imported through Aden, and in the last century it was also a major qat-producing area. Most of the lower-quality qat was grown in the Maktari district to the south of Taiz, and although the better quality qat was grown in the Mawiya area to the south of Sana'a, it was traded through Taiz⁴. The introduction of air transport of qat from Ethiopia

in the 1950s caused a doubling in qat consumption in Aden, the vast majority of which was from Ethiopia, with a corresponding reduction in the quantity previously imported from Yemen⁶. In 1967 Manciola and Parrinello, working in an Italian medical mission in Taiz, estimated that 67.3% of males and 37.8% of females between the ages of 17 and 50 habitually chewed qat. If occasional users are included, the figure increased to 90.7% and 58.5% respectively²⁶.

The annual expenditure on qat in Aden Colony in 1955 exceeded \$5 million, although most of this was imported by air from Ethiopia²⁵. Following the oil boom of the 1970s, many Yemenis took up employment in Saudi Arabia and the Gulf States, and remitted vast sums of money. This has had a massive effect on the Yemeni economy. The Second Five-Year Development Plan (1982-86) states that 47.2% of its requirements will be financed through 'national savings, including the remittances of the Yemeni expatriates', and this must be interpreted in the light of the knowledge that domestic savings were negative during the First Five Year Plan²⁸. The main effect of chronic consumption of qat is the economic and social damage caused to the individual and the community due to loss of working time, estimated at 3-5 hours per day²⁹, overspending and consequent malnutrition.

Use of qat outside Yemen

The pattern of qat usage seems to have been quite different in other parts of the region. In Ethiopia it is apparently not used by Christians^{2,5}, but does play a prominent role in Muslim festivals. There is a reference to a party in the Harar region held from 9 to 11 in the morning during which chapters of the Qur'an were quoted². In the south, when it was desired to cultivate the fields, a farmer would call together his neighbours who would drink an infusion called *hoja* made from coffee rind, and chew qat from 6 until 10. They would then work continually until evening. Among the Galla, to whom qat is known as *gofa*, qat chewing is an important element in the *Zar* ceremony. This is centred around the belief in possession by evil genii, and probably originated among Christian slaves captured in Abyssinia, subsequently spreading throughout the region. It also plays a central role in the *wadaja* festival, which consists of collective prayers at times of misfortune⁶. It is apparently quite widely used by Ethiopians and Somalis in London, and is flown in twice weekly from Ethiopia^{23,24}.

Beneficial aspects of qat production

The vast increase in qat production throughout the 1970s has had a number of beneficial effects upon the qat-growing and surrounding areas. The high level of disposable income has resulted in an increased market for agricultural produce such as fruit and sorghum, which although more expensive than imported grain has considerable prestige value. The importance of terraces for qat cultivation has ensured their upkeep, unlike the situation in other parts of the country where the migration of workers to neighbouring countries has allowed the walls to fall into disrepair. The importance of marketing qat rapidly has led to the building of roads to many villages, financed by local cooperatives, and the improved communications have permitted firewood to be brought in by truck, thus removing one of the

major tasks previously carried out by women. Women have also benefited from the increased income which has helped to provide cisterns in most homes, which can be filled by tanker, preventing the need for a daily journey to collect water. There has also been an increase in electrification, and in provision of electric flour mills which have replaced the previous stone ones.

The future

Much of the recent increase in qat production in the Yemen Arab Republic has been stimulated by the money sent back by migrant workers in Saudi Arabia and the Gulf. It is apparent that this is already declining, partly due to the increased importation of labour from Asia. The unprecedented affluence experienced by Yemenis in recent years is only temporary. It seems that qat has provided a short-term solution to the problems of the country by maintaining a viable agricultural community and promoting rural development. Because of the unique factors in qat marketing, there has not been a move towards large plantations, and most villages still have diversified agriculture. It is to be hoped that Yemen will be able to make good use of this opportunity.

Conclusion

Qat has a major role in the culture of Yemen and surrounding countries, and there has been a substantial increase in production in recent years, some of which is exported to the United Kingdom. It has had a major effect on the economies of the countries in which it is grown, and is associated with physical and psychological effects which doctors should be aware of when treating patients from this region. It has permitted conservation of rural communities and agricultural potential, but with a reduction in disposable income in Yemen the future is uncertain.

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